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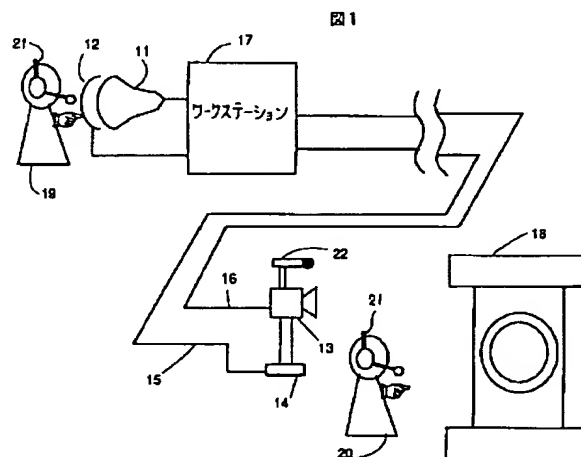
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(54)【発明の名称】 遠隔ポインティング装置

(57)【要約】

【構成】 A地点からB地点にある対象物を指示する遠隔ポインティング装置であって、B地点の画像を撮像する撮像手段21と、該撮像手段により得られた画像情報をA地点へ転送する画像転送手段16と、B地点から転送された画像をA地点で画面上に表示する画像表示手段11と、該画像表示手段により表示された画像に基づいてA地点でB地点の対象物を指示する指示手段12と、該指示手段の出力に応じて制御情報を生成する制御情報生成手段17と、前記制御情報をB地点へ転送する制御情報転送手段15と、該転送された制御情報に基づいてB地点で、前記指示された対象物の少なくとも一部に視認可能な変化を起こさせる変化惹起手段22とを備えた。

【効果】 離れた場所におけるコミュニケーションの手段が増し、よりよいプラント監視ができるようになる。また、本発明を遠隔会議システムに応用することにより今まで情報の共有に際し文書を電子化するなどの手間が掛からなくなる。



【特許請求の範囲】

【請求項 1】 A 地点から B 地点にある対象物を指示する遠隔ポインティング装置であって、
B 地点の画像を撮像する撮像手段と、
該撮像手段により得られた画像情報を A 地点へ転送する画像転送手段と、
B 地点から転送された画像を A 地点で画面上に表示する画像表示手段と、
該画像表示手段により表示された画像に基づいて A 地点で B 地点の対象物を指示する指示手段と、
該指示手段の出力に応じて制御情報を生成する制御情報生成手段と、
前記制御情報を B 地点へ転送する制御情報転送手段と、
該転送された制御情報に基づいて B 地点で、前記指示された対象物の少なくとも一部に視認可能な変化を起こさせる変化惹起手段と、
を備えたことを特徴とする遠隔ポインティング装置。

【請求項 2】 前記変化惹起手段は対象物に対して光ビームを射出するビーム装置であることを特徴とする請求項 2 記載の遠隔ポインティング装置。

【請求項 3】 前記撮像手段は遠隔操作可能なテレビカメラであり、前記制御情報に基づいて前記対象物が画像の中心に位置するように前記テレビカメラの角度が制御されることを特徴とする請求項 1 または 2 記載の遠隔ポインティング装置。

【請求項 4】 前記撮像手段は遠隔操作可能なテレビカメラであり、前記ビーム装置が前記テレビカメラに固定されたことを特徴とする請求項 2 記載の遠隔ポインティング装置。

【請求項 5】 前記撮像手段は遠隔操作可能なテレビカメラであり、前記ビーム装置の角度は前記テレビカメラとは独立して制御されることを特徴とする請求項 2 記載の遠隔ポインティング装置。

【請求項 6】 前記指示手段は、前記画面上で指示された座標に基づいて対象物を特定することを特徴とする請求項 1 記載の遠隔ポインティング装置。

【請求項 7】 対象物の識別子が記載され当該対象物に付けられた複数のタグと、前記撮像手段により得られた前記複数のタグの画像に基づき各タグの識別子を認識する認識手段とをさらに備え、前記指示された座標および各タグの識別子の認識結果に基づいて前記対象物の特定を行うことを特徴とする請求項 6 記載の遠隔ポインティング装置。

【請求項 8】 前記指示手段は、キー入力された対象物の名称に基づいて対象物の特定を行うことを特徴とする請求項 1 記載の遠隔ポインティング装置。

【請求項 9】 前記指示手段は、前記画面上で対象物の一覧メニューに基づいて対象物の特定を行うことを特徴とする請求項 1 記載の遠隔ポインティング装置。

【請求項 10】 前記指示手段は、対象物を表わした複数

のアイコンに基づいて対象物の特定を行うことを特徴とする請求項 1 記載の遠隔ポインティング装置。

【請求項 11】 前記制御情報生成手段は、前記ビーム装置の現在の角度情報を得て、該角度情報をも用いて前記制御情報を生成することを特徴とする請求項 2 または 5 記載の遠隔ポインティング装置。

【請求項 12】 前記制御情報生成手段は、前記テレビカメラの現在の角度情報を得て、該角度情報をも用いて前記制御情報を生成することを特徴とする請求項 3 または 4 記載の遠隔ポインティング装置。

【請求項 13】 請求項 1 記載の遠隔ポインティング装置を用い、前記 A 地点を中央操作室、前記 B 地点をプラントの現場としたことを特徴とするプロセス監視システム。

【請求項 14】 請求項 1 記載の遠隔ポインティング装置を 2 組用い、遠隔会議の双方から遠隔指示を可能としたことを特徴とする遠隔会議システム。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、プラント監視あるいは遠隔会議などのように、離れた場所で情報のやり取りや意思の決定を行なう場合に、会話中に用いられる指示代名詞を実際の事物に結び付け、物の指示を円滑に行なうことができる遠隔ポインティング装置に関する。

【0002】

【従来の技術】従来から、遠隔会議などに使われる ISDN を利用した会議システムでは、会議参加者による情報の共有が電子的に行なわれていた。これは、共有したい文書や写真等を予めワードプロセッサやスキャナなどで電子化して端末の中に蓄えておき、それを電子的なポインティングデバイスで双方から指し示すことによって、お互いの意思疎通を図るものである。

【0003】しかし、このような形態では端末内に情報を取り込む作業が必要である。また、あらかじめ情報として取り込めないような机上の物体を指して、「その色と同じ」というような指示ができなかった。

【0004】また、その場で新しく手に入ったような資料をお互いに共有するためには、書画テレビカメラを用いてその資料を映し出すことによって情報を共有することができた。しかしこれでは、資料を持っていない側の人間が、資料の一部を指し示すための手段が無く、言葉などでそれを説明するしかなかった。

【0005】また一方、プラントシステムにおいては、特開平 3-1297 号等に開示されているように、プラントの現場に設置されたテレビカメラにより、中央操作室にいる監視員は映像により現場を監視することができるようになっている。このようなプラント監視において、中央操作室にいる監視員と、プラントの現場で作業をしている保守員との間でトランシーバなどで連絡をとって作業を進めるといった場合がある。この時に、監視

員の方から、機器の一部や場所を指定する場合、予め機器の名称に関して統一しておくなり場所や方向の呼び方について決めておくなどしなければ、意思の疎通が図れなかった。

【0006】さらに、中央操作室には監視のためのモニターがあるが、監視員が見ている場面が現場の保守員には見えないので、監視員が直接モニターを指して機器を指定するような直感的な指定の方法が使えない。

【0007】

【発明が解決しようとする課題】このように従来では、遠隔地間で情報を指示するために、映像や音声などの手段を用いて間接的に示したり指示をしていたりしていた。しかし、これらの方法ではどうしても指し示せないような情報が有ったり、事前に準備が必要なためにとつた場合に役に立たなかったり、また遠隔地の両方に特殊な装置が必要なために、相手が動き回ったりするような場合には適用出来ないなどといった問題があった。

【0008】本発明ではかかる問題を解決するために、プラント監視や遠隔会議などテレビカメラを用いた映像情報のやり取りを行っている状況において、離れたところにいる相手側にこちら側がテレビカメラで何処を注視しているかという情報をより直接的に伝えることができる遠隔ポインティング装置を提供する。

【0009】

【課題を解決するための手段】本発明による遠隔ポインティング装置は、A地点からB地点にある対象物を指示する遠隔ポインティング装置であって、B地点の画像を撮像する撮像手段と、該撮像手段により得られた画像情報をA地点へ転送する画像転送手段と、B地点から転送された画像をA地点で画面上に表示する画像表示手段と、該画像表示手段により表示された画像に基づいてA地点でB地点の対象物を指示する指示手段と、該指示手段の出力に応じて制御情報を生成する制御情報生成手段と、前記制御情報をB地点へ転送する制御情報転送手段と、該転送された制御情報に基づいてB地点で、前記指示された対象物の少なくとも一部に視認可能な変化を起こさせる変化惹起手段とを備えたものである。

【0010】好ましくは、前記変化惹起手段は対象物に対して光ビームを射出するビーム装置である。

【0011】前記撮像手段は遠隔操作可能なテレビカメラであり、前記制御情報に基づいて前記対象物が画像の中心に位置するように前記テレビカメラの角度が制御される。

【0012】また、本発明によるプロセス監視システムは、この遠隔ポインティング装置を用い、前記A地点を中央操作室、前記B地点をプラントの現場としたものである。

【0013】さらに、本発明による遠隔会議システムは、前記遠隔ポインティング装置を2組用い、遠隔会議の双方から遠隔指示を可能としたものである。

【0014】

【作用】以下、本発明の代表的な構成の作用を説明する。

【0015】B地点には指示しようとする対象物が複数存在し、テレビカメラ等の撮像手段によりB地点の画像が画像転送手段によりA地点で表示手段の画面上に表示される。A地点にいる者が、B地点にある対象物を指示しようとするとき、指示手段により画面上で対象物を指示する。この指示情報に基づいて、制御情報生成手段により、ビーム装置等の変化惹起手段を制御するための制御情報が生成され、制御情報転送手段によりB地点へ転送される。同時に、指示された対象物を画像の中心に位置させるようにテレビカメラの角度が制御される。ビーム装置がテレビカメラに固定されている場合には、テレビカメラのみが制御される。

【0016】この構成により、A地点にいる者が指示した対象物に光ビームのスポットが当り、A地点にいる者が何を指示しているのかをB地点にいる者が即座にかつ確実に認識することができる。指示したい対象物を予め電子化して端末に取り込んでおくような事前の準備は必要なく、相手が動き回ったりするような場合にも容易に対応することができる。

【0017】

【実施例】まず、図1に、本発明をプラント監視に適用した実施例を示す。同図において、11は監視ディスプレイ、12はタッチパネル、13は監視カメラ、14は監視カメラ遠隔操縦装置、15は遠隔操縦用ネットワーク、16は映像送信用ネットワーク、17はワークステーション、18はプラント装置、19は監視者、20は保守員、21はトランシーバ、22は赤色ポインティングライト装置である。

【0018】監視カメラ遠隔操縦装置14は、マイクロコンピュータ（マイコン）、ステッピングモータおよび位置センサから構成されている。マイコンは、遠隔操縦用ネットワーク15を介して受けたワークステーション17からの指令に応じて、ステッピングモータを使って監視カメラ13を指定された角度で動かすことができる。また、センサを用いて現在の監視カメラ13のズーム率と角度を調べ、それを遠隔操縦用ネットワーク15を介してワークステーション17に知らせる機能を持つ。遠隔操縦用ネットワーク15は、監視カメラ遠隔操縦装置14中のマイコンとワークステーションを結ぶI/Oバスである。映像送信用ネットワーク16は、監視カメラ13からの映像を多重伝送を用いてワークステーション17まで運んでいる。

【0019】今、中央操作室でプラントを監視している監視者19は、プラントの現場にいる保守員20に対してプラント装置18を指し示そうとしている場合を考える。監視者19は、トランシーバ21を用いて、「このプラント装置を点検せよ」と保守員20に指示する。同

時に、監視者19は監視ディスプレイ11にてプラント装置18の位置を指し示す。

【0020】タッチパネル12は、監視者19が画面上で指し示した位置(x、y)を感知し、それをワークステーション17に通知する。ただし、(x、y)は光軸方向つまり画面の中心を原点としたときのx、y直交座標である。

【0021】ワークステーション17は遠隔操縦用ネットワーク15を介して監視カメラ13の現在のズーム率Zを問い合わせる。そして、タッチパネル12より知らされた監視者19が指し示した画面上の位置(x、y)から監視カメラ13を動かす角度を以下のように計算す

$$R_x = \text{atan}(x/ZT)、\quad R_y = \text{atan}(y/ZT) \quad (\text{数1})$$

となる。

【0023】この数1の計算に基づき、角度(R_x、R_y)分だけ監視カメラ13の角度を変更する。すなわち、x方向に-R_x度、Y方向に-R_y度だけ動かすように指令を遠隔操縦用ネットワーク15を通じて監視カメラ遠隔操縦装置14に送る。指令を受けた監視カメラ遠隔操縦装置14は監視カメラ13を動かす。これにより、監視カメラ13は、監視者19が指し示した位置が画面の真ん中にくるような角度をとる。

【0024】一方、監視カメラ13には赤色ポインティングライト装置22が取付けてあり、ちょうど監視カメラ13のレンズの光軸に一致するように向きが設定されている。そのため、監視ディスプレイ11で中心に見えるプラント装置18に赤色ポインティングライト装置22の光が当たるようになっている。

【0025】このため、監視員が指し示したプラント装置18が監視ディスプレイの中心になるように監視カメラ13が動き、なおかつ赤色ポインティングライト装置22の光がその物体に当たるようになる。そのため、現場にいる保守員20は監視員19がプラント装置18を見ていることを具体的に理解できる。

【0026】なお、赤色ポインティング装置22を直接カメラの上部に固定したのでは、光軸にきちんと合わせることができない場合がある。その時にはハーフミラーとプリズムを用いてカメラの光軸にライトの光軸が一致するようにする方法も考えられる。

【0027】図3は、監視カメラ13に赤色ポインティングライト装置を固定するのではなく、監視カメラ13を直接制御する実施例を示す。同図において図1と同一の要素には同一の参照番号を付してある。この実施例では、赤色ポインティングライト装置22およびこれを制御するポインティングライト遠隔操縦装置23は監視カメラ13とは独立に配置され、遠隔操縦用ネットワーク15に接続されている。

【0028】本実施例でも、中央操作室でプラントを監視している監視者19が、プラントの現場にいる保守員20に対してプラント装置18を指し示そうとしている

る。

【0022】図2は、監視ディスプレイ11の画面と実際に見ているフレームとの関係を示したものである。ズーム率Z=1のときに画面上の点(x、y)の光軸とのずれ角をx軸方向、y軸方向に対して(R_x、R_y)とすると、

$$R_x = \text{atan}(x/T)、\quad R_y = \text{atan}(y/T)$$

となる。ここで、Tは画面から仮想的な消失点O迄の距離であるが、これはカメラ固有の定数となる。ズーム率が変化すると画面上で(x、y)の位置に見えるものでも実際はズーム率Z=1の時の(x/Z、y/Z)の位置にあるから、ズーム率を考えたときの光軸とのずれは、

(数1)

場合を考える。

【0029】監視者19は、トランシーバ21を用いて「このプラント装置を点検せよ」と保守員20に指示する。同時に、監視ディスプレイ11にてプラント装置18の位置を指し示す。

【0030】タッチパネル12は、監視者19が画面上で指し示した位置(x、y)を感知し、それをワークステーション17に告知する。ただし、(x、y)は光軸方向つまり画面の中心を原点としたときの座標である。

【0031】ワークステーション17は遠隔操縦用ネットワーク15を介して監視カメラ13の現在のズーム率Zを問い合わせる。そして、タッチパネル12より知らされた監視者19が指し示した画面上の位置(x、y)から赤色ポインティング装置22を動かす角度を上記数1を用いて計算する。

【0032】次に、監視カメラ遠隔操縦装置14に対して現在の角度(B_x、B_y)を問い合わせる。これを用いて、角度(R_x-B_x、R_y-B_y)分だけ赤色ポインティングライト22を動かす。すなわち、X方向に-R_x+B_x度、Y方向に-R_y+B_y度だけ動かすように、指令を遠隔操縦用ネットワーク15を通じてポインティング遠隔操縦装置23に送る。ポインティングライト遠隔操縦装置23は、この値に従い赤色ポインティングライト装置22を動かす。その結果、プラント装置18にライトが当たる。これにより、保守員20は監視者19が指し示しているプラント装置18が具体的に理解できる。

【0033】さらに、監視カメラ13と赤色ポインティングライト装置22とを独立に(連動させずに)動かす場合も考えられる。この方法を使うと、通常は監視ディスプレイ11で指された物を中心になるようにカメラを動かし同時に赤色ポインティング装置22でその指されたものにライトを当てるようにし、監視カメラ遠隔操縦装置14の制限により向けられない物体が監視員19によって指されたときには、赤色ポインティング装置22のみ動かしライトが当たるようにすることができる。

【0034】図4は、物体指示手段として、ライトでは

なく予め物体に複数のランプを取付けておき、そのうちの1個を選択的に点灯させることにより指示を行なうようにした例を示す。401はプラント装置18に付けられた指示ランプである。

【0035】ワークステーション17は、監視画面の座標のどの範囲にどういふ機器が配置されているかというテーブルを持っている。図5はこのテーブルの例である。このテーブルの第1列が項番、第2列が機器の占める画面上の領域、第3列が機器の名前、第4列が機器の番号になっている。このようにテーブルには機器の名前と機器番号が、その画面上に占める矩形の領域のデータとともに管理されている。尚、矩形の領域のデータは左上の頂点と右下の頂点のデータから構成されている。

【0036】このテーブルを上から順番に検索していき、タッチパネル12からの座標(x, y)が第2列の領域に含まれるかどうか判定する。もし、含まれなければ次に進む。

【0037】テーブルを全部検索しつくしても、座標の含まれる領域が見つからない場合は何もしない。

【0038】もし座標(x, y)が含まれた場合には、第4列の機器の番号からその機器についているランプ401のスイッチを確定し、それをワークステーション17からそのスイッチを入れるよう指令を出力する。もしすでに別の機器のランプ401のスイッチが入っていた場合にはそのスイッチを切る指令も出力する。

【0039】ワークステーション17でスイッチの入り／切りを行うためには、RS232cなどワークステーションの出力用ポートにマイコンを接続する方法がある。ワークステーション側から「No. 1 ON」、「No. 2 OFF」などの簡単なコマンドを送り、それに応じてマイコンの方で番号に応じたリレー回路を動作させてスイッチの開閉が実現できる。

【0040】このような動作を行うことによって、赤色ポインティングライト装置22を用いた場合には指示できなかった細かな機器の部分まで指し示すことが出来るようになる。

【0041】また、今まではすべてタッチパネルの情報をそのまま用いて、指し示された機器を特定していたが、機器が相互に入り組んでいるような複雑な場合はどうしても機器の間の区別がつけにくい。この場合は、画像認識を用いてもっと正確に機器を特定する他の実施例を提供する。物体指示には、赤色ポインティングライト装置を監視カメラに固定する方法を採用する。機器の構成は図1と同じになる。

【0042】今までの例と同様に、監視員19が監視ディスプレイ11上でタッチパネル12を指示すると、その画面上の座標(x, y)がワークステーション17に通知される。

【0043】機器には図6に示すような画像認識用のタグ601が付けられている。このタグ601には、例え

ば機器の番号が記載されている。ワークステーション17はカメラの画像の情報からこのタグの部分のみ画像処理で切り出す。これはある決った大きさの白い領域を切り出すといったフィルタをつくることによって実現できる。画像内に複数のタグがあれば複数のタグを切り出す。

【0044】切り出された複数のタグの領域の画像の内、監視ディスプレイの画面上で最も位置的に座標(x, y)に近いものを取り出す。2つ以上の領域が該当する場合には、画面上で一番左上に近いものを選ぶ。

【0045】選ばれた領域の中に書かれている機器の番号を数字の認識によって読み取る。

【0046】ワークステーション17には、機器の番号とそれに対応する赤色ポインティングライト装置22の角度を組にしたテーブルが格納されている。図7にこのテーブルの例を示す。このテーブルの第1列が機器の番号、第2列が機器の名称、第3列が赤色ポインティングライト装置のx方向の角度、第4列が同じくy方向の角度を示す。認識された機器の番号をこのテーブルの第1列と順に比較していき、一致した場合はポインティング装置遠隔操縦装置14に対して遠隔操縦用ネットワーク15を介して監視カメラ13の動くべき角度を指令する。監視カメラ遠隔操縦装置14はこの値に従い監視カメラ13を動かす。その結果、監視カメラ13は監視者19が指した位置に最も近いタグの映像が画面の真ん中にくるような角度になる。

【0047】同時に赤色ポインティングライト装置22のライトがタグを照らすことになり、保守員20は監視員19によりどの機器が指し示されたかを即座に理解できる。

【0048】さらに図8は監視員19が機器を指し示すのにタッチパネルによる画面上の座標情報を用いる方法ではなく、マウスとメニューを用いる例である。同図において、801はマウス、802は選択メニュー、803はマウスポインタ、804はキーボードである。全体の機器の構成は図1と同じである。なお、メニューはアイコンを利用するものであってもよい。

【0049】監視者はマウス801を動かすことによってマウスポインタ803を操作する。監視ディスプレイ11上には監視対象となる機器の名前が選択メニュー802の形で表示されている。ポインタ803を選択メニュー802の中の指し示したい機器の項目を選び、マウス801のボタンを押しメニューの項目を選択する。

【0050】ワークステーション17中には、メニューの項目番号とそれに対応する赤色ポインティングライト装置22の角度を組にしたテーブルが格納されている。図9にこのテーブルの例を示す。テーブルの第1列はメニュー項目番号、第2列は機器名、第3列は赤色ポインティングライト装置のx方向の角度、第4列は同じくy方向の角度を示す。

【0051】選択されたメニューの項目番号をこのテーブルの第1列の番号と順に比較していき、両者が一致した場合は、そのメニュー項目番号の内容に従い、ポインティング装置遠隔操縦装置14に対して遠隔操縦用ネットワーク15を介して監視カメラ13の動くべき角度を指令する。これに応じて監視カメラ遠隔操縦装置14は監視カメラ13を動かす。その結果、監視カメラ13は監視者19が指し示したい機器の映像が画面の真ん中にくるような角度になる。

【0052】同時に、赤色ポインティングライト装置22のライトが機器を照らすことになり、保守員20は監視員19がどの機器を指し示したかを直ちに理解することができる。

【0053】同様に、指示する物体の決定に画面上の座標ではなくコマンド入力を用いることができる。

【0054】この場合、監視者は、指し示したい機器の名称をキーボード804より入力する。ワークステーション17中には、機器の名称とそれに対応する赤色ポインティングライト装置の角度を組にしたテーブルが格納されている。図7に示したテーブルを同様に使うことができる。

【0055】入力された機器の名称をこのテーブルの第2列と順に比較していき、一致した場合は、ポインティング装置遠隔操縦装置に対して遠隔操縦用ネットワークを介して監視カメラの動くべき角度を指令する。監視カメラ遠隔操縦装置はこの値のように監視カメラを動かす、監視カメラは監視者が指し示したい機器の映像が画面の真ん中にくるような角度になる。同時に赤色ポインティングライト装置22のライトが機器を照らすことになり、保守員20はどの機器が指し示されたか理解できる。

【0056】さらにこのような監視カメラ13と赤色ポインティングライト装置22が複数あっても同様な操作が可能である。図10にシステム構成を示す。赤色ポインティングライト装置22が監視カメラ13に固定されている場合について説明する。

【0057】監視員19は、保守員20と共同作業をしている。保守員20は作業を行う場所に到着した時に、トランシーバを用いて監視員19に現在の位置を知らせる。

【0058】その連絡を受けた監視員19は、その場所にある監視カメラ13の画像を画面に映すようにワークステーション17に指令する。

【0059】ワークステーション17が保守員20の居る場所の監視カメラ13に切り変えて、監視ディスプレイ11に表示する。同時に、遠隔操縦用ネットワーク15に対して現在切り変えた監視カメラ13に付けられた監視カメラ遠隔操縦装置14との単独の接続を指令する。これ以降、ワークステーション17は複数ある監視カメラ遠隔操縦装置14の内、1つとしか情報のやりと

りをしなくなる。

【0060】監視者は、トランシーバを用いて「このプラント装置を点検せよ」と、保守員20に指示する。同時に、監視ディスプレイ11にてプラント装置の位置を指し示す。

【0061】タッチパネルは、監視者19が画面上で指し示した位置(x, y)を感知し、それをワークステーション17に通知する。

【0062】ワークステーション17は遠隔操縦用ネットワーク15を介して現在選択されている監視カメラ13の現在のズーム率Zを問い合わせる。そして、タッチパネルより知らされた監視者19が指し示した画面上の位置(x, y)から現在選択されている監視カメラ13を動かす角度を計算する。(数1) この数1の計算に基づき、角度(Rx, Ry)分だけ現在選択されている監視カメラ13の角度を変更する。x方向に-Rx度、Y方向に-Ry度だけ動かすように指令を遠隔操縦用ネットワーク15を通じて現在選択されている監視カメラ遠隔操縦装置14に送る。現在選択されている監視カメラ遠隔操縦装置14はこの値のように現在選択されている監視カメラ13を動かす、現在選択されている監視カメラ13は監視者19が指した位置が画面の真ん中にくるような角度になる。

【0063】監視カメラ15には赤色ポインティングライト装置22が取付けてあり、ちょうど監視カメラ15のレンズの光軸に一致するように向きが設定されている。そのため、監視ディスプレイ11で中心に見えているプラント装置に赤色ポインティングライト装置22の光が当たるようになる。

【0064】このため、監視員が指し示したプラント装置が監視ディスプレイの中心になるように現在選択されている監視カメラ13が動き、なおかつ赤色ポインティングライト装置22の光がその物体に当たるようになる。そのため、複数の監視カメラがある場合でも現場にいる保守員20は監視員19がプラント装置を見ていることを具体的に理解できる。

【0065】このように、複数の監視カメラおよび赤色ポインティングライト装置があった場合でも、1つの場合と同様に監視員は保守員に対して機器を指し示すことができる。

【0066】また、この時に監視カメラと赤色ポインティングライト装置の数が不一致の場合も考えられる。

【0067】このような場合には、監視カメラと赤色ポインティングライト装置を別々にコントロールする。そして各々の監視カメラに対応する赤色ポインティングライト装置を最低1つ決めておく。監視カメラを選択したときに対応する赤色ポインティングライト装置があれば適当なものを選ぶこととし、もし無ければポインティングが出来ないことを監視員に通知する。

【0068】また、このような装置は、プラントの監視

だけではなく遠隔で会議を行うようなシステムにも使うことができる。図11は、本発明を遠隔会議において実施した例である。1101は会議のメンバー、1102はディスプレイおよびタッチパネルを埋め込んだワークステーションを内蔵した会議卓である。

【0069】双方の会議室に、各々相手の遠隔ポインティング装置をコントロールするワークステーション内蔵の会議卓1102を供えている。会議卓1102の上部にはディスプレイが埋め込まれていて表面にはタッチパネルが付けられている。会議に参加しているメンバー1101はこの会議卓1102上に映っている相手側の会場の映像を指すことによって、相手側の会場にある物体、人物などを赤色ポインティングライト装置22で指し示すことが出来る。

【0070】このような装置を用いることによって、おたがいの周囲の環境の情報を共有し、ポインティングすることができ、より緊密なコミュニケーションが可能となる。

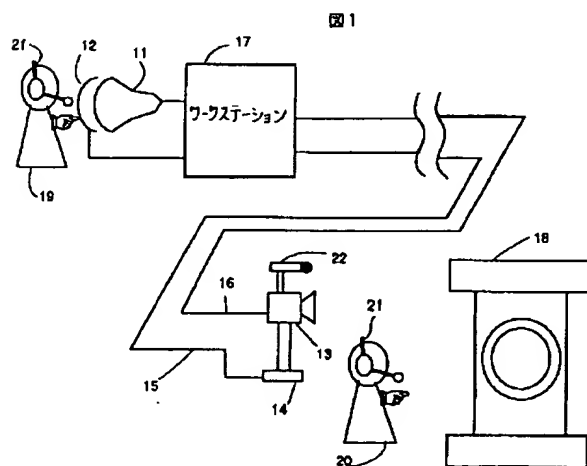
【0071】

【発明の効果】本発明により、離れた場所におけるコミュニケーションの手段が増し、よりよいプラント監視ができるようになる。また、本発明を遠隔会議システムに应用することにより今まで情報の共有に際し文書を電子化するなどの手間が掛からなくなる。

【図面の簡単な説明】

【図1】図1は、赤色ポインティングライト装置を監視カメラに固定した実施例のブロック図である。

【図1】



【図2】図2は、監視カメラのフレームを示した概念図である。

【図3】図3は、赤色ポインティングライト装置を監視カメラとは独立に制御する実施例のブロック図である。

【図4】図4は、監視対象に発光装置をつけた実施例の説明図である。

【図5】図5は、監視ディスプレイ上の領域と機器との関係の対応テーブルの一例の説明図である。

【図6】図6は、画像処理を用いる最に監視対象に取り付けるタグの一例の説明図である。

【図7】図7は、機器の名称と赤色ポインティングライト装置の角度との対応テーブルの一例の説明図である。

【図8】図8は、メニューで指し示す機器を選択する実施例の説明図である。

【図9】図9は、メニュー番号と赤色ポインティングライト装置の角度との対応テーブルの一例の説明図である。

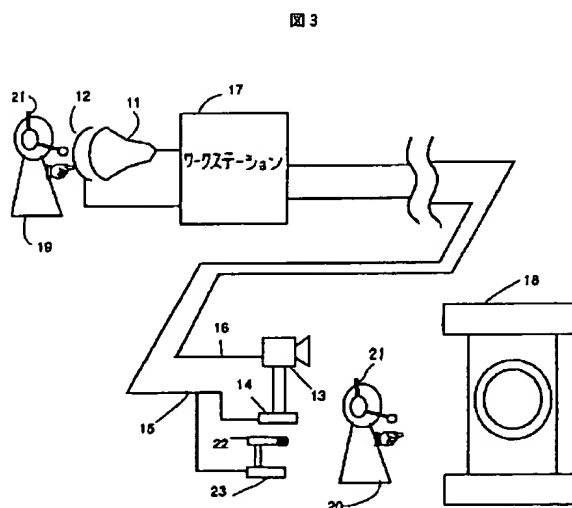
【図10】図10は、監視カメラと赤色ポインティングライト装置を多数用いた実施例の説明図である。

【図11】図11は、本発明を遠隔会議システムに应用した実施例の説明図である。

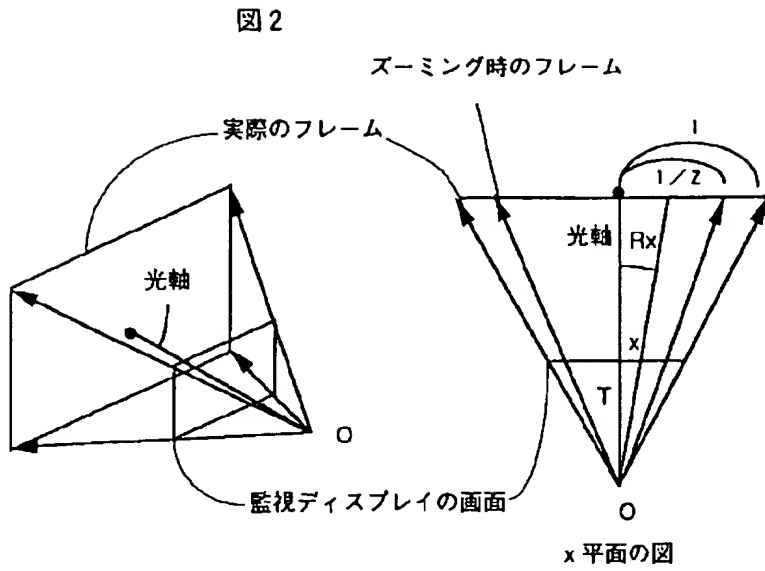
【符号の説明】

11…監視ディスプレイ、12…タッチパネル、13…監視カメラ、14…監視カメラ遠隔縦装置、15…遠隔縦装置用ネットワーク、16…映像送信用ネットワーク、17…ワークステーション、18…プラント装置、19…監視者、20…保守員、21…トランシーバ、22…赤色ポインティングライト装置。

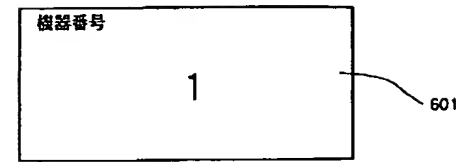
【図3】



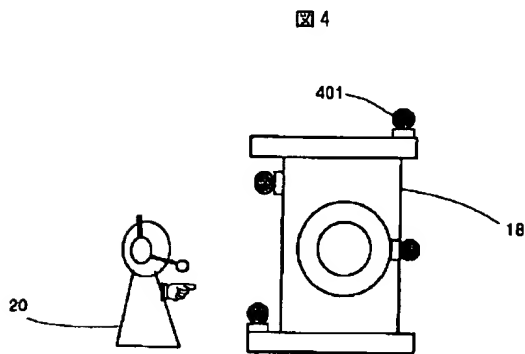
【図2】



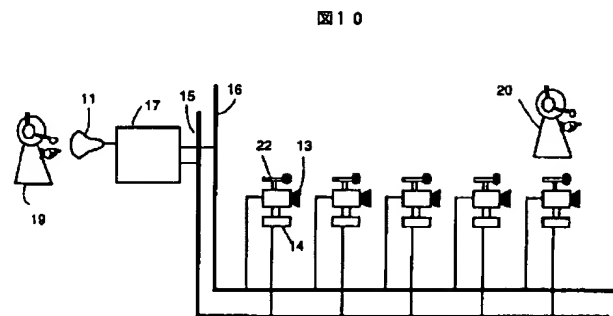
【図6】



【図4】



【図10】



【図5】

図5

項番	領域	機器名	機器番号
1	(10, 10)-(100, 100)	機器1	1 2
2	(150, 100)-(400, 120)	バルブ1	1 4
3	(-100, 100)-(-200, 200)	機器2	3 7
4	(500, 300)-(550, 350)	バルブ2	5 1
5	(-200, -120)-(-220, -170)	台座	1 7

【図 7】

図 7

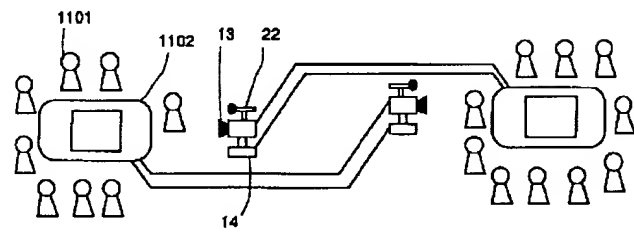
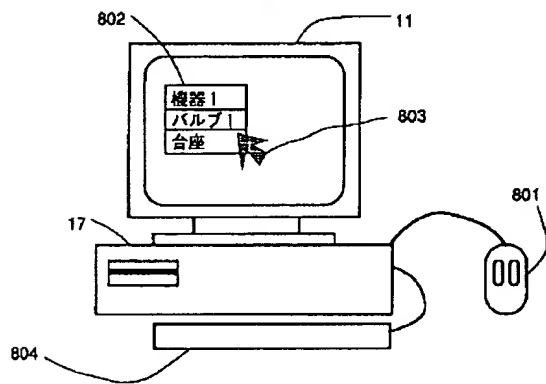
機器番号	機器名	赤色ポインティングライト装置の角度	
		x 方向	y 方向
1 2	機器 1	3 0	- 1 0
1 4	バルブ 1	2 0	1 5
3 7	機器 2	4 5	- 3 0
5 1	バルブ 2	- 5	0
1 7	台座	7 0	- 7 0

【図 8】

【図 1 1】

図 8

図 1 1



【図 9】

図 9

メニュー項目番号	機器名	赤色ポインティングライト装置の角度	
		x 方向	y 方向
1	機器 1	3 0	- 1 0
2	バルブ 1	2 0	1 5
3	機器 2	4 5	- 3 0
4	バルブ 2	- 5	0
5	台座	7 0	- 7 0

フロントページの続き

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CLAIMS

[Claim(s)]

[Claim 1] An image pick-up means to be remote pointing equipment which directs the object which is in B point from A point, and to picturize the image of B point. An image transfer means to transmit the image information obtained by this image pick-up means to A point. An image display means to display on a screen the image transmitted from B point at A point. A directions means to direct the object of B point at A point based on the image displayed by this image display means. It is based on a control information generation means to generate control information according to the output of this directions means, a control information transfer means to transmit said control information to B point, and the this transmitted control information. At B point Remote pointing equipment characterized by having a change inducement means to make change which can be checked by looking to said some of directed objects [at least] cause.

[Claim 2] Said change inducement means is remote pointing equipment according to claim 2 characterized by being the beam arrangement which injects a light beam to an object.

[Claim 3] Said image pick-up means is remote pointing equipment according to claim 1 or 2 which is the television camera which can be operated by remote control, and is characterized by controlling the include angle of said television camera so that said object is located at the core of an image based on said control information.

[Claim 4] Said image pick-up means is remote pointing equipment according to claim 2 which is the television camera which can be operated by remote control, and is characterized by fixing said beam arrangement to said television camera.

[Claim 5] Said television camera is remote pointing equipment according to claim 2 characterized by for said image pick-up means being the television camera which can be operated by remote control, and controlling independently the include angle of said beam arrangement.

[Claim 6] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on the coordinate directed on said screen.

[Claim 7] Remote pointing equipment according to claim 6 characterized by having further a recognition means to recognize the identifier of each tag based on the image of two or more tags which the identifier of an object was indicated and were attached in the object concerned, and two or more of said tags obtained by said image pick-up means, and specifying said object based on said directed coordinate and the recognition result of the identifier of each tag.

[Claim 8] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on the name of the object which it keyed.

[Claim 9] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on the list menu of an object on said screen.

[Claim 10] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on two or more icons showing an object.

[Claim 11] Said control information generation means is remote pointing equipment according to claim 2 or 5 characterized by acquiring the current include-angle information on said beam arrangement, and generating said control information also using this include-angle information.

[Claim 12] Said control information generation means is remote pointing equipment according to claim 3 or 4 characterized by acquiring the current include-angle information on said television camera, and generating said control information also using this include-angle information.

[Claim 13] The process monitoring system characterized by having made said A point into the central operation room, and making said B point into the site of a plant using remote pointing equipment according to claim 1.

[Claim 14] The remote conference system characterized by making 2 sets of remote indication possible from the both sides of teleconferencing using remote pointing equipment according to claim 1.

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TECHNICAL FIELD

[Industrial Application] When making an informational exchange and the decision of an intention like a plant monitor or teleconferencing in the distant location, this invention connects the demonstrative pronoun used all busy to things actual, and relates to the remote pointing equipment which can direct an object smoothly.

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PRIOR ART

[Description of the Prior Art] In the conference system which used from the former ISDN used for teleconferencing etc., sharing of the information by the meeting participant was done electronically. This aims at each other intention Bahnung by electronizing a document, a photograph, etc. sharing with a word processor, a scanner, etc. beforehand, storing into the terminal, and pointing to it from both sides with an electronic pointing device.

[0003] However, the activity which incorporates information is required of such a gestalt in a terminal. Moreover, the body on the desk which cannot be beforehand incorporated as information was pointed out, and the directions "it was the same as the color" were not completed.

[0004] Moreover, in order to share data which were obtained newly on that spot to each other, information was sharable by projecting the data using a paintings-and-calligraphic-works television camera. However, there is no means for near human being without data to point to some data, and now could not but explain it by means of language etc.

[0005] Moreover, on the other hand, the hitcher on who is present in a central operation room with the television camera installed in the site of a plant can supervise a site now with an image as indicated by JP,3-1297,A etc. in the plant system. In such a plant monitor, it may have been said that it contacted by a transceiver etc. between the hitcher on who is present in a central operation room, and the customer engineer which is working in the site of a plant, and an activity was done. Bahnung of an intention was not able to be aimed at, if it did not decide about how to call a location or a direction as soon as it unified about the name of a device beforehand from hitchers on at this time, when the part and location of a device were specified.

[0006] Furthermore, although there is a monitor for a monitor in a central operation room, since the scene which the hitcher on is looking at is not visible to the customer engineer of a site, the approach of intuitive assignment that a hitcher on points out a direct monitor and specifies a device cannot be used.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Thus, in the former, in order to direct information between remote places, means, such as an image and voice, were used, and it was shown indirectly and was directing. However, by these approaches, since equipment special to both remote places was required, when it was not helpful in moment [*** / that there is information to which it can never point / beforehand] since preparation is required, and a partner moved about, there was a problem of being inapplicable etc.

[0008] In this invention, in order to solve this problem, in the situation of exchanging image information which used television cameras, such as a plant monitor and teleconferencing, the remote pointing equipment which can tell the information where the side here is gazing with the television camera, more directly to the other party which is present in the distant place is offered.

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MEANS

[Means for Solving the Problem] An image pick-up means for the remote pointing equipment by this invention to be remote pointing equipment which directs the object which is in B point from A point, and to picturize the image of B point, An image transfer means to transmit the image information obtained by this image pick-up means to A point, An image display means to display on a screen the image transmitted from B point at A point, A directions means to direct the object of B point at A point based on the image displayed by this image display means, It is based on a control information generation means to generate control information according to the output of this directions means, a control information transfer means to transmit said control information to B point, and the this transmitted control information. At B point It has a change inducement means to make change which can be checked by looking to said some of directed objects [at least] cause.

[0010] Preferably, said change inducement means is a beam arrangement which injects a light beam to an object.

[0011] Said image pick-up means is the television camera which can be operated by remote control, and the include angle of said television camera is controlled so that said object is located at the core of an image based on said control information.

[0012] Moreover, using this remote pointing equipment, said A point is made into a central operation room, and the process monitoring system by this invention makes said B point the site of a plant.

[0013] Furthermore, the remote conference system by this invention makes 2 sets of remote indication possible from the both sides of teleconferencing using said remote pointing equipment.

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OPERATION

[Function] Hereafter, an operation of the typical configuration of this invention is explained.

[0015] Two or more objects which it is going to direct exist in B point, and the image of B point is displayed by the image transfer means on the screen of a display means with image pick-up means, such as a television camera, at A point. When those who are present in A point are going to direct the object at B point, an object is directed on a screen with a directions means. Based on this directions information, the control information for controlling change inducement means, such as a beam arrangement, by the control information generation means is generated, and it is transmitted to B point by the control information transfer means. The include angle of a television camera is controlled to locate at the core of an image the object directed to coincidence. Only a television camera is controlled when the beam arrangement is being fixed to the television camera.

[0016] The spot of a light beam hits the object which those who are present in A point directed by this configuration, and those what whose those who are present in A point are directing it is in B point can recognize immediately and certainly. Prior preparation which electronizes an object to direct beforehand and is incorporated to the terminal is unnecessary, and also when a partner moves about, it can respond easily.

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EFFECT OF THE INVENTION

[Effect of the Invention] It comes to be able to perform the increase of the means of the communication in the distant location, and a better plant monitor by this invention. The time and effort of electronizing a document on the occasion of informational sharing until now stops moreover, taking by applying this invention to a remote conference system.

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EXAMPLE

[Example] First, the example which applied this invention to the plant monitor at drawing 1 is shown. this drawing — setting — 11 — a monitor display and 12 — a touch panel and 13 — a surveillance camera and 14 — a surveillance camera remote control and 15 — the network for remote control, and 16 — for plant equipment and 19, as for a customer engineer and 21, a monitor and 20 are [the network for image transmission, and 17 / a workstation and 18 / a transceiver and 22] red pointing light equipment.

[0018] The surveillance camera remote control 14 consists of a microcomputer (microcomputer), a stepping motor, and a position sensor. A microcomputer can be moved according to the command from a workstation 17 received through the network 15 for remote control at the include angle which had the surveillance camera 13 specified using a stepping motor. Moreover, the current rate of a zoom and current include angle of a surveillance camera 13 are investigated using a sensor, and it has the function to tell a workstation 17 about it through the network 15 for remote control. The network 15 for remote control is an I/O bus which ties the microcomputer and workstation in the surveillance camera remote control 14. The network 16 for image transmission is carrying the image from a surveillance camera 13 to the workstation 17 using multiplex transmission.

[0019] Now, the monitor 19 who is supervising the plant in the central operation room considers the case where it is going to point to plant equipment 18 to the customer engineer 20 which is present in the site of a plant. A monitor 19 directs "to check this plant equipment" to a customer engineer 20 using a transceiver 21. To coincidence, a monitor 19 points to the location of plant equipment 18 on the monitor display 11.

[0020] A touch panel 12 senses the location (x y) to which the monitor 19 pointed on the screen, and notifies it to a workstation 17. However, (x, y) are x when making the core of the direction of an optical axis, i.e., a screen, into a zero, and y rectangular coordinates.

[0021] A workstation 17 asks the current rate Z of a zoom of a surveillance camera 13 through the network 15 for remote control. And the include angle to which a surveillance camera 13 is moved from the location on the screen to which the monitor 19 told from the touch panel 12 pointed (x y) is calculated as follows.

[0022] Drawing 2 shows relation with the frame actually regarded as the screen of the monitor display 11. the time of the rate $Z=1$ of a zoom — a gap angle with the optical axis of the point on a screen (x y) — the direction of a x axis, and the direction of the y-axis — receiving — ** (Rx, Ry) — if it carries out — $Rx = \text{atan}(x/T)$ It is set to $Ry = \text{atan}(y/T)$. Here, although T is the distance from the screen to the imagination vanishing point O, this serves as a constant of a camera proper. Gap with the optical axis when considering the rate of a zoom, since some which are visible to the location of (x, y) on a screen were in the location of (x/Z, y/Z) at the time of the rate $Z=1$ of a zoom in practice when the rate of a zoom changed (several 1) $Rx = \text{atan}(x/ZT)$ $Ry = \text{atan}(y/ZT)$ It becomes.

[0023] Based on this count of several one, the include angle of a surveillance camera 13 is changed by the include angle (Rx, Ry). That is, a command is sent to the surveillance camera remote control 14 through the network 15 for remote control so that only the degree of -Ry may be moved in the x directions in the degree of -Rx, and the direction of Y. The surveillance camera remote control 14 which received the command moves a surveillance camera 13. Thereby, a surveillance camera 13 takes an include angle for which the location to which the monitor 19 pointed comes to the middle of a screen.

[0024] On the other hand, red pointing light equipment 22 is attached in the surveillance camera 13, and the sense is set up so that it may be in agreement with the optical axis of the lens of a surveillance camera 13 exactly. Therefore, the light of red pointing light equipment 22 shines upon the plant equipment 18 which is showing at the core on the monitor display 11.

[0025] for this reason, the plant equipment 18 to which the hitcher on pointed takes the lead in a monitor display — as — a surveillance camera 13 — moving — in addition — and the light of red pointing light equipment 22 comes to shine upon that body. Therefore, the customer engineer 20 which is present in a site can understand concretely that the hitcher on 19 is looking at plant equipment 18.

[0026] In addition, red pointing equipment 22 may be unable to be exactly set by the optical axis by having fixed to the upper part of a direct camera. Then, the approach make it whose optical axis of a light correspond with the optical axis of a camera using a half mirror and prism is also considered.

[0027] Drawing 3 shows the example which controls a surveillance camera 13 directly rather than fixes red pointing light equipment to a surveillance camera 13. In this drawing, the same reference number is given to the same element as drawing 1. In this example, the pointing light remote control 23 which controls red pointing light equipment 22 and this is arranged independently [a surveillance camera 13], and is connected to the network 15 for remote control.

[0028] This example also considers the case where the monitor 19 who is supervising the plant is going to point to

[0029] A monitor 19 directs "to check this plant equipment" to a customer engineer 20 using a transceiver 21. To coincidence, it points to the location of plant equipment 18 on the monitor display 11.

[0030] A touch panel 12 senses the location (x y) to which the monitor 19 pointed on the screen, and notifies a workstation 17 of it. However, (x, y) are the coordinates when making the core of the direction of an optical axis, i.e., a screen, into a zero.

[0031] A workstation 17 asks the current rate Z of a zoom of a surveillance camera 13 through the network 15 for remote control. And the include angle to which red pointing equipment 22 is moved from the location on the screen to which the monitor 19 told from the touch panel 12 pointed (x y) is calculated using one above.

[0032] Next, a current include angle (Bx, By) is asked to the surveillance camera remote control 14. The red pointing light 22 is moved by the include angle (Rx-Bx, Ry-By) using this. That is, a command is sent to the pointing remote control 23 through the network 15 for remote control so that only the degree of -Ry+By may be moved in the direction of X in the degree of -Rx+Bx, and the direction of Y. The pointing light remote control 23 operates red pointing light equipment 22 according to this value. Consequently, a light hits plant equipment 18. Thereby, the plant equipment 18 to which the monitor 19 is pointing can understand a customer engineer 20 concretely.

[0033] Furthermore, also when operating independently a surveillance camera 13 and red pointing light equipment 22 (** which is not interlocked), it thinks. If this approach is used, a camera is moved, a light is put in red pointing equipment 22 to coincidence at that thing to which it was pointed out so that it may become centering on the object to which it was usually pointed out on the monitor display 11, when pointed out to the body which is not turned by limit of the surveillance camera remote control 14 by the hitcher on 19, only red pointing equipment 22 is operated and a light can hit.

[0034] As a body directions means, drawing 4 attaches not a light but two or more lamps in the body beforehand, and shows the example which was made to direct by making the light switch on alternatively [one piece] of them. 401 is the indicator lamp attached to plant equipment 18.

[0035] The workstation 17 has the table what kind of device is arranged in which range of the coordinate of a monitor screen. Drawing 5 is the example of this table. The field on the screen which an item number occupies [the 1st train of this table], and a device occupies [the 2nd train], and the 3rd train have the identifier of a device, and the 4th train has a number of a device. Thus, the identifier and equipment item number of a device are managed by the table with the data of the rectangular field occupied on the screen. In addition, the data of a rectangular field consist of data of upper left top-most vertices and lower right top-most vertices.

[0036] This table is searched in an order from the top, and it judges whether the coordinate (x y) from a touch panel 12 is included to the field of the 2nd train. If not contained, it progresses to a degree.

[0037] Even if it all searches a table, nothing is done when the field where a coordinate is included is not found.

[0038] When a coordinate (x y) is included, the switch of the lamp 401 currently attached to the device from the number of the device of the 4th train is decided, and a command is outputted so that the switch may be turned on for it from a workstation 17. When the switch of the lamp 401 of another device is already on, the command which turns off the switch is also outputted.

[0039] In order for a workstation 17 to perform entering/end of a switch, the approach of connecting a microcomputer is in the port for an output of workstations, such as RS232c. According to delivery and it, the relay circuit corresponding easy commands, such as "No.1 ON" and "No.2 OFF", to the number is operated in the direction of a microcomputer from a workstation side, and closing motion of a switch can be realized.

[0040] By performing such actuation, when red pointing light equipment 22 is used, it can point to the part of the fine device which was not able to be directed.

[0041] Moreover, although the device to which it pointed was specified altogether until now, using the information on a touch panel as it is, when [complicated] the device is mutually complex, it is surely hard to attach distinction between devices. In this case, other examples which specify a device more correctly using image recognition are offered. The approach of fixing red pointing light equipment to a surveillance camera is adopted as body directions. The configuration of a device becomes the same as drawing 1.

[0042] Like an old example, if a hitcher on 19 directs a touch panel 12 on the monitor display 11, the coordinate on the screen (x y) will be notified to a workstation 17.

[0043] The tag 601 for image recognition as shown in drawing 6 is attached to the device. The number of a device is indicated by this tag 601. A workstation 17 starts only the part of this tag by the image processing from the information on the image of a camera. This is realizable by building the filter of starting the field where a certain regular magnitude is white. If two or more tags are in an image, two or more tags will be cut down.

[0044] The thing near a coordinate (x y) in location is most taken out on a monitor scope among the images of the field of two or more cut-down tags. When two or more fields correspond, the thing near most the upper left is chosen on a screen.

[0045] The number of the device currently written in the selected field is read according to recognition of a figure.

[0046] The table which made the group the number of a device and the include angle of the red pointing light equipment 22 corresponding to it is stored in the workstation 17. The example of this table is shown in drawing 7. The 1st train of this table shows the number of a device, the include angle of the x directions of red pointing light equipment and the 4th train are [the name of a device, and the 3rd train] the same, and the 2nd train shows the include angle of the direction of y. When in agreement [as compared with the 1st train and order of this table] in the number of the recognized device, it is ordered the include angle by which a surveillance camera 13 should run through the network 15 for remote control to the pointing equipment remote control 14. The surveillance camera remote control 14 moves a surveillance camera 13 according to this value. Consequently, a surveillance camera 13

comes to the middle of a screen.

[0047] The light of red pointing light equipment 22 will compare a tag with coincidence, and a customer engineer 20 can understand immediately to which device the hitcher on 19 pointed.

[0048] Furthermore, drawing 8 is an example using not the approach using coordinate information but the mouse and menu on the screen according to a touch panel for a hitcher on 19 pointing to a device. For 801, as for a selection menu and 803, in this drawing, a mouse and 802 are [a mouse pointer and 804] keyboards. The configuration of the whole device is the same as drawing 1 . In addition, a menu may use an icon.

[0049] A monitor operates a mouse pointer 803 by moving a mouse 801. On the monitor display 11, the identifier of the device used as the candidate for a monitor is displayed in the form of a selection menu 802. The item of the device in a selection menu 802 to point to a pointer 803 is chosen, and the item of a push menu is chosen for the carbon button of a mouse 301.

[0050] All over the workstation 17, the table which made the group the item number of a menu and the include angle of the red pointing light equipment 22 corresponding to it is stored. The example of this table is shown in drawing 9 R> 9. The 1st train of a table shows a menu item number, as for the 2nd train, a device name and the 3rd train are the same and the include angle of the x directions of red pointing light equipment and the 4th train show the include angle of the direction of y.

[0051] When both are in agreement in the item number of the selected menu as compared with numerical order of the 1st train of this table, according to the contents of that menu item number, it is ordered the include angle by which a surveillance camera 13 should run through the network 15 for remote control to the pointing equipment remote control 14. According to this, the surveillance camera remote control 14 moves a surveillance camera 13. Consequently, a surveillance camera 13 becomes the include angle for which the image of the device to which a monitor 19 wants to point comes to the middle of a screen.

[0052] The light of red pointing light equipment 22 will compare a device with coincidence, and, as for a customer engineer 20, a hitcher on 19 can understand immediately to which device it pointed.

[0053] Similarly, not a coordinate but the command input on a screen can be used for the decision of the body to direct.

[0054] In this case, a monitor inputs the name of a device to point from a keyboard 804. All over the workstation 17, the table which made the group the name of a device and the include angle of the red pointing light equipment corresponding to it is stored. The table shown in drawing 7 can be used similarly.

[0055] When in agreement [as compared with the 2nd train and order of this table] in the name of the inputted device, it is ordered the include angle by which a surveillance camera should run through the network for remote control to a pointing equipment remote control. A surveillance camera remote control moves a surveillance camera like this value, and a surveillance camera becomes the include angle for which the image of the device to which a monitor wants to point comes to the middle of a screen. The light of red pointing light equipment 22 will compare a device with coincidence, and a customer engineer 20 can understand to which device it pointed.

[0056] The same actuation is possible even if there are two or more still such surveillance cameras 13 and red pointing light equipments 22. A system configuration is shown in drawing 10 . The case where red pointing light equipment 22 is being fixed to the surveillance camera 13 is explained.

[0057] The hitcher on 19 is doing the joint activity on the customer engineer 20. When it arrives at the location which works, a customer engineer 20 uses a transceiver and tells a hitcher on 19 about a current location.

[0058] The hitcher on 19 who received the communication orders a workstation 17 so that the image of the surveillance camera 13 in the location may be projected on a screen.

[0059] A workstation 17 changes to the surveillance camera 13 of the location in which a customer engineer 20 is, and displays on the monitor display 11. It is ordered the independent connection with the surveillance camera remote control 14 attached to the surveillance camera 13 changed to coincidence to the network 15 for remote control now. A workstation 17 will not exchange information with one of the surveillance camera remote controls 14 which have more than one after this.

[0060] A monitor directs "to check this plant equipment" to a customer engineer 20 using a transceiver. To coincidence, it points to the location of plant equipment on the monitor display 11.

[0061] A touch panel senses the location (x y) to which the monitor 19 pointed on the screen, and notifies it to a workstation 17.

[0062] A workstation 17 asks the current rate Z of a zoom of the surveillance camera 13 by which current selection is made through the network 15 for remote control. And the include angle to which the surveillance camera 13 by which current selection is made from the location on the screen to which the monitor 19 told from the touch panel pointed (x y) is moved is calculated. (Several 1) Based on this count of several one, the include angle of the surveillance camera 13 by which current selection is made by the include angle (Rx, Ry) is changed. A command is sent to the surveillance camera remote control 14 by which current selection is made through the network 15 for remote control so that only the degree of -Ry may be moved in the x directions in the degree of -Rx, and the direction of Y. The surveillance camera remote control 14 by which current selection is made moves the surveillance camera 13 by which current selection is made like this value, and the surveillance camera 13 by which current selection is made becomes the include angle for which the location which the monitor 19 pointed out comes to the middle of a screen.

[0063] Red pointing light equipment 22 is attached in the surveillance camera 15, and the sense is set up so that it may be in agreement with the optical axis of the lens of a surveillance camera 15 exactly. Therefore, the light of red pointing light equipment 22 comes to shine upon the plant equipment which is showing at the core on the monitor display 11.

[0064] For this reason, the surveillance camera 13 by which current selection is made so that the plant equipment to

which the hitcher on pointed may take the lead in a monitor display — moving — in addition — and the light of red pointing light equipment 22 comes to shine upon that body. Therefore, even when there are two or more surveillance cameras, the customer engineer 20 which is present in a site can understand concretely that the hitcher on 19 is looking at plant equipment.

[0065] Thus, even when there are two or more surveillance cameras and red pointing light equipment, a hitcher on can point to a device to a customer engineer like one case.

[0066] Moreover, at this time, also when the number of a surveillance camera and red pointing light equipment is an inequality, it thinks.

[0067] In such a case, a surveillance camera and red pointing light equipment are controlled separately. And at least one red pointing light equipment corresponding to each surveillance camera is decided. If there is red pointing light equipment when a surveillance camera is chosen, it will suppose that a suitable thing is chosen, and if there is nothing, a hitcher on will be notified of pointing being impossible.

[0068] Moreover, such equipment can be used not only for the monitor of a plant but for a system which holds a conference by remoteness. Drawing 11 is the example which carried out this invention in teleconferencing. It is a meeting table having the workstation by which 1101 embedded the member of a meeting and 1102 embedded the display and the touch panel.

[0069] The meeting table 1102 with a built-in workstation which controls a partner's remote pointing equipment respectively is offered on both conference rooms. The display is embedded in the upper part of the meeting table 1102, and the touch panel is attached to the front face. By pointing out the image in the hall of the other party reflected on this meeting table 1102, the member 1101 who has participated in the meeting can point to a body, a person, etc. at the hall of the other party with red pointing light equipment 22.

[0070] By using such equipment, the pointing of the information on the environment around each other can be shared and carried out, and closer communication is attained.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] When making an informational exchange and the decision of an intention like a plant monitor or teleconferencing in the distant location, this invention connects the demonstrative pronoun used all busy to things actual, and relates to the remote pointing equipment which can direct an object smoothly.

[0002]

[Description of the Prior Art] In the conference system which used from the former ISDN used for teleconferencing etc., sharing of the information by the meeting participant was done electronically. This aims at each other intention Bahnung by electronizing a document, a photograph, etc. sharing with a word processor, a scanner, etc. beforehand, storing into the terminal, and pointing to it from both sides with an electronic pointing device.

[0003] However, the activity which incorporates information is required of such a gestalt in a terminal. Moreover, the body on the desk which cannot be beforehand incorporated as information was pointed out, and the directions "it was the same as the color" were not completed.

[0004] Moreover, in order to share data which were obtained newly on that spot to each other, information was sharable by projecting the data using a paintings-and-calligraphic-works television camera. However, there is no means for near human being without data to point to some data, and now could not but explain it by means of language etc.

[0005] Moreover, on the other hand, the hitcher on who is present in a central operation room with the television camera installed in the site of a plant can supervise a site now with an image as indicated by JP,3-1297,A etc. in the plant system. In such a plant monitor, it may have been said that it contacted by a transceiver etc. between the hitcher on who is present in a central operation room, and the customer engineer which is working in the site of a plant, and an activity was done. Bahnung of an intention was not able to be aimed at, if it did not decide about how to call a location or a direction as soon as it unified about the name of a device beforehand from hitchers on at this time, when the part and location of a device were specified.

[0006] Furthermore, although there is a monitor for a monitor in a central operation room, since the scene which the hitcher on is looking at is not visible to the customer engineer of a site, the approach of intuitive assignment that a hitcher on points out a direct monitor and specifies a device cannot be used.

[0007]

[Problem(s) to be Solved by the Invention] Thus, in the former, in order to direct information between remote places, means, such as an image and voice, were used, and it was shown indirectly and was directing. However, by these approaches, since equipment special to both remote places was required, when it was not helpful in moment [**** / that there is information to which it can never point / beforehand] since preparation is required, and a partner moved about, there was a problem of being inapplicable etc.

[0008] In this invention, in order to solve this problem, in the situation of exchanging image information which used television cameras, such as a plant monitor and teleconferencing, the remote pointing equipment which can tell the information where the side here is gazing with the television camera, more directly to the other party which is present in the distant place is offered.

[0009]

[Means for Solving the Problem] An image pick-up means for the remote pointing equipment by this invention to be remote pointing equipment which directs the object which is in B point from A point, and to picturize the image of B point, An image transfer means to transmit the image information obtained by this image pick-up means to A point, An image display means to display on a screen the image transmitted from B point at A point, A directions means to direct the object of B point at A point based on the image displayed by this image display means, It is based on a control information generation means to generate control information according to the output of this directions means, a control information transfer means to transmit said control information to B point, and the this transmitted control information. At B point It has a change inducement means to make change which can be checked by looking to said some of directed objects [at least] cause.

[0010] Preferably, said change inducement means is a beam arrangement which injects a light beam to an object.

[0011] Said image pick-up means is the television camera which can be operated by remote control, and the include angle of said television camera is controlled so that said object is located at the core of an image based on said control information.

[0012] Moreover, using this remote pointing equipment, said A point is made into a central operation room, and the process monitoring system by this invention makes said B point the site of a plant.

[0013] Furthermore, the remote conference system by this invention makes 2 sets of remote indication possible

[0014]

[Function] Hereafter, an operation of the typical configuration of this invention is explained.

[0015] Two or more objects which it is going to direct exist in B point, and the image of B point is displayed by the image transfer means on the screen of a display means with image pick-up means, such as a television camera, at A point. When those who are present in A point are going to direct the object at B point, an object is directed on a screen with a directions means. Based on this directions information, the control information for controlling change inducement means, such as a beam arrangement, by the control information generation means is generated, and it is transmitted to B point by the control information transfer means. The include angle of a television camera is controlled to locate at the core of an image the object directed to coincidence. Only a television camera is controlled when the beam arrangement is being fixed to the television camera.

[0016] The spot of a light beam hits the object which those who are present in A point directed by this configuration, and those what whose those who are present in A point are directing it is in B point can recognize immediately and certainly. Prior preparation which electronizes an object to direct beforehand and is incorporated to the terminal is unnecessary, and also when a partner moves about, it can respond easily.

[0017]

[Example] First, the example which applied this invention to the plant monitor at drawing 1 is shown. this drawing — setting — 11 — a monitor display and 12 — a touch panel and 13 — a surveillance camera and 14 — a surveillance camera remote control and 15 — the network for remote control, and 16 — for plant equipment and 19, as for a customer engineer and 21, a monitor and 20 are [the network for image transmission, and 17 / a workstation and 18 / a transceiver and 22] red pointing light equipment.

[0018] The surveillance camera remote control 14 consists of a microcomputer (microcomputer), a stepping motor, and a position sensor. A microcomputer can be moved according to the command from a workstation 17 received through the network 15 for remote control at the include angle which had the surveillance camera 13 specified using a stepping motor. Moreover, the current rate of a zoom and current include angle of a surveillance camera 13 are investigated using a sensor, and it has the function to tell a workstation 17 about it through the network 15 for remote control. The network 15 for remote control is an I/O bus which ties the microcomputer and workstation in the surveillance camera remote control 14. The network 16 for image transmission is carrying the image from a surveillance camera 13 to the workstation 17 using multiplex transmission.

[0019] Now, the monitor 19 who is supervising the plant in the central operation room considers the case where it is going to point to plant equipment 18 to the customer engineer 20 which is present in the site of a plant. A monitor 19 directs "to check this plant equipment" to a customer engineer 20 using a transceiver 21. To coincidence, a monitor 19 points to the location of plant equipment 18 on the monitor display 11.

[0020] A touch panel 12 senses the location (x y) to which the monitor 19 pointed on the screen, and notifies it to a workstation 17. However, (x, y) are x when making the core of the direction of an optical axis, i.e., a screen, into a zero, and y rectangular coordinates.

[0021] A workstation 17 asks the current rate Z of a zoom of a surveillance camera 13 through the network 15 for remote control. And the include angle to which a surveillance camera 13 is moved from the location on the screen to which the monitor 19 told from the touch panel 12 pointed (x y) is calculated as follows.

[0022] Drawing 2 shows relation with the frame actually regarded as the screen of the monitor display 11. the time of the rate $Z=1$ of a zoom — a gap angle with the optical axis of the point on a screen (x y) — the direction of a x axis, and the direction of the y-axis — receiving — $** (R_x, R_y)$ — if it carries out — $R_x = \text{atan} (x/T)$ It is set to $R_y = \text{atan} (y/T)$. Here, although T is the distance from the screen to the imagination vanishing point O, this serves as a constant of a camera proper. Gap with the optical axis when considering the rate of a zoom, since some which are visible to the location of (x, y) on a screen were in the location of (x/Z, y/Z) at the time of the rate $Z=1$ of a zoom in practice when the rate of a zoom changed (several 1) $R_x = \text{atan} (x/ZT)$ $R_y = \text{atan} (y/ZT)$

It becomes.

[0023] Based on this count of several one, the include angle of a surveillance camera 13 is changed by the include angle (Rx, Ry). That is, a command is sent to the surveillance camera remote control 14 through the network 15 for remote control so that only the degree of $-R_y$ may be moved in the x directions in the degree of $-R_x$, and the direction of Y. The surveillance camera remote control 14 which received the command moves a surveillance camera 13. Thereby, a surveillance camera 13 takes an include angle for which the location to which the monitor 19 pointed comes to the middle of a screen.

[0024] On the other hand, red pointing light equipment 22 is attached in the surveillance camera 13, and the sense is set up so that it may be in agreement with the optical axis of the lens of a surveillance camera 13 exactly. Therefore, the light of red pointing light equipment 22 shines upon the plant equipment 18 which is showing at the core on the monitor display 11.

[0025] for this reason, the plant equipment 18 to which the hitcher on pointed takes the lead in a monitor display — as — a surveillance camera 13 — moving — in addition — and the light of red pointing light equipment 22 comes to shine upon that body. Therefore, the customer engineer 20 which is present in a site can understand concretely that the hitcher on 19 is looking at plant equipment 18.

[0026] In addition, red pointing equipment 22 may be unable to be exactly set by the optical axis by having fixed to the upper part of a direct camera. Then, the approach make it whose optical axis of a light correspond with the optical axis of a camera using a half mirror and prism is also considered.

[0027] Drawing 3 shows the example which controls a surveillance camera 13 directly rather than fixes red pointing light equipment to a surveillance camera 13. In this drawing, the same reference number is given to the same element as drawing 1. In this example, the pointing light remote control 23 which controls red pointing light equipment 22 and this is connected independently to a surveillance camera 13 and is connected to the network 15

for remote control.

[0028] This example also considers the case where the monitor 19 who is supervising the plant is going to point to plant equipment 18 in the central operation room to the customer engineer 20 which is present in the site of a plant.

[0029] A monitor 19 directs "to check this plant equipment" to a customer engineer 20 using a transceiver 21. To coincidence, it points to the location of plant equipment 18 on the monitor display 11.

[0030] A touch panel 12 senses the location (x y) to which the monitor 19 pointed on the screen, and notifies a workstation 17 of it. However, (x, y) are the coordinates when making the core of the direction of an optical axis, i.e., a screen, into a zero.

[0031] A workstation 17 asks the current rate Z of a zoom of a surveillance camera 13 through the network 15 for remote control. And the include angle to which red pointing equipment 22 is moved from the location on the screen to which the monitor 19 told from the touch panel 12 pointed (x y) is calculated using one above.

[0032] Next, a current include angle (Bx, By) is asked to the surveillance camera remote control 14. The red pointing light 22 is moved by the include angle (Rx-Bx, Ry-By) using this. That is, a command is sent to the pointing remote control 23 through the network 15 for remote control so that only the degree of -Ry+By may be moved in the direction of X in the degree of -Rx+Bx, and the direction of Y. The pointing light remote control 23 operates red pointing light equipment 22 according to this value. Consequently, a light hits plant equipment 18. Thereby, the plant equipment 18 to which the monitor 19 is pointing can understand a customer engineer 20 concretely.

[0033] Furthermore, also when operating independently a surveillance camera 13 and red pointing light equipment 22 (** which is not interlocked), it thinks. If this approach is used, a camera is moved, a light is put in red pointing equipment 22 to coincidence at that thing to which it was pointed out so that it may become centering on the object to which it was usually pointed out on the monitor display 11, when pointed out to the body which is not turned by limit of the surveillance camera remote control 14 by the hitcher on 19, only red pointing equipment 22 is operated and a light can hit.

[0034] As a body directions means, drawing 4 attaches not a light but two or more lamps in the body beforehand, and shows the example which was made to direct by making the light switch on alternatively [one piece] of them. 401 is the indicator lamp attached to plant equipment 18.

[0035] The workstation 17 has the table what kind of device is arranged in which range of the coordinate of a monitor screen. Drawing 5 is the example of this table. The field on the screen which an item number occupies [the 1st train of this table], and a device occupies [the 2nd train], and the 3rd train have the identifier of a device, and the 4th train has a number of a device. Thus, the identifier and equipment item number of a device are managed by the table with the data of the rectangular field occupied on the screen. In addition, the data of a rectangular field consist of data of upper left top-most vertices and lower right top-most vertices.

[0036] This table is searched in an order from the top, and it judges whether the coordinate (x y) from a touch panel 12 is included to the field of the 2nd train. If not contained, it progresses to a degree.

[0037] Even if it all searches a table, nothing is done when the field where a coordinate is included is not found.

[0038] When a coordinate (x y) is included, the switch of the lamp 401 currently attached to the device from the number of the device of the 4th train is decided, and a command is outputted so that the switch may be turned on for it from a workstation 17. When the switch of the lamp 401 of another device is already on, the command which turns off the switch is also outputted.

[0039] In order for a workstation 17 to perform entering/end of a switch, the approach of connecting a microcomputer is in the port for an output of workstations, such as RS232c. According to delivery and it, the relay circuit corresponding easy commands, such as "No.1 ON" and "No.2 OFF", to the number is operated in the direction of a microcomputer from a workstation side, and closing motion of a switch can be realized.

[0040] By performing such actuation, when red pointing light equipment 22 is used, it can point to the part of the fine device which was not able to be directed.

[0041] Moreover, although the device to which it pointed was specified altogether until now, using the information on a touch panel as it is, when [complicated] the device is mutually complex, it is surely hard to attach distinction between devices. In this case, other examples which specify a device more correctly using image recognition are offered. The approach of fixing red pointing light equipment to a surveillance camera is adopted as body directions. The configuration of a device becomes the same as drawing 1.

[0042] Like an old example, if a hitcher on 19 directs a touch panel 12 on the monitor display 11, the coordinate on the screen (x y) will be notified to a workstation 17.

[0043] The tag 601 for image recognition as shown in drawing 6 is attached to the device. The number of a device is indicated by this tag 601. A workstation 17 starts only the part of this tag by the image processing from the information on the image of a camera. This is realizable by building the filter of starting the field where a certain regular magnitude is white. If two or more tags are in an image, two or more tags will be cut down.

[0044] The thing near a coordinate (x y) in location is most taken out on a monitor scope among the images of the field of two or more cut-down tags. When two or more fields correspond, the thing near most the upper left is chosen on a screen.

[0045] The number of the device currently written in the selected field is read according to recognition of a figure.

[0046] The table which made the group the number of a device and the include angle of the red pointing light equipment 22 corresponding to it is stored in the workstation 17. The example of this table is shown in drawing 7. The 1st train of this table shows the number of a device, the include angle of the x directions of red pointing light equipment and the 4th train are [the name of a device, and the 3rd train] the same, and the 2nd train shows the include angle of the direction of y. When in agreement [as compared with the 1st train and order of this table] in the number of the presumed device, it is ordered the include angle to which a surveillance camera 13 should aim

through the network 15 for remote control to the pointing equipment remote control 14. The surveillance camera remote control 14 moves a surveillance camera 13 according to this value. Consequently, a surveillance camera 13 becomes the include angle for which the image of the tag nearest to the location which the monitor 19 pointed out comes to the middle of a screen.

[0047] The light of red pointing light equipment 22 will compare a tag with coincidence, and a customer engineer 20 can understand immediately to which device the hitcher on 19 pointed.

[0048] Furthermore, drawing 8 is an example using not the approach using coordinate information but the mouse and menu on the screen according to a touch panel for a hitcher on 19 pointing to a device. For 801, as for a selection menu and 803, in this drawing, a mouse and 802 are [a mouse pointer and 804] keyboards. The configuration of the whole device is the same as drawing 1 . In addition, a menu may use an icon.

[0049] A monitor operates a mouse pointer 803 by moving a mouse 801. On the monitor display 11, the identifier of the device used as the candidate for a monitor is displayed in the form of a selection menu 802. The item of the device in a selection menu 802 to point to a pointer 803 is chosen, and the item of a push menu is chosen for the carbon button of a mouse 301.

[0050] All over the workstation 17, the table which made the group the item number of a menu and the include angle of the red pointing light equipment 22 corresponding to it is stored. The example of this table is shown in drawing 9 R> 9. The 1st train of a table shows a menu item number, as for the 2nd train, a device name and the 3rd train are the same and the include angle of the x directions of red pointing light equipment and the 4th train show the include angle of the direction of y.

[0051] When both are in agreement in the item number of the selected menu as compared with numerical order of the 1st train of this table, according to the contents of that menu item number, it is ordered the include angle by which a surveillance camera 13 should run through the network 15 for remote control to the pointing equipment remote control 14. According to this, the surveillance camera remote control 14 moves a surveillance camera 13. Consequently, a surveillance camera 13 becomes the include angle for which the image of the device to which a monitor 19 wants to point comes to the middle of a screen.

[0052] The light of red pointing light equipment 22 will compare a device with coincidence, and, as for a customer engineer 20, a hitcher on 19 can understand immediately to which device it pointed.

[0053] Similarly, not a coordinate but the command input on a screen can be used for the decision of the body to direct.

[0054] In this case, a monitor inputs the name of a device to point from a keyboard 804. All over the workstation 17, the table which made the group the name of a device and the include angle of the red pointing light equipment corresponding to it is stored. The table shown in drawing 7 can be used similarly.

[0055] When in agreement [as compared with the 2nd train and order of this table] in the name of the inputted device, it is ordered the include angle by which a surveillance camera should run through the network for remote control to a pointing equipment remote control. A surveillance camera remote control moves a surveillance camera like this value, and a surveillance camera becomes the include angle for which the image of the device to which a monitor wants to point comes to the middle of a screen. The light of red pointing light equipment 22 will compare a device with coincidence, and a customer engineer 20 can understand to which device it pointed.

[0056] The same actuation is possible even if there are two or more still such surveillance cameras 13 and red pointing light equipments 22. A system configuration is shown in drawing 10 . The case where red pointing light equipment 22 is being fixed to the surveillance camera 13 is explained.

[0057] The hitcher on 19 is doing the joint activity on the customer engineer 20. When it arrives at the location which works, a customer engineer 20 uses a transceiver and tells a hitcher on 19 about a current location.

[0058] The hitcher on 19 who received the communication orders a workstation 17 so that the image of the surveillance camera 13 in the location may be projected on a screen.

[0059] A workstation 17 changes to the surveillance camera 13 of the location in which a customer engineer 20 is, and displays on the monitor display 11. It is ordered the independent connection with the surveillance camera remote control 14 attached to the surveillance camera 13 changed to coincidence to the network 15 for remote control now. A workstation 17 will not exchange information with one of the surveillance camera remote controls 14 which have more than one after this.

[0060] A monitor directs "to check this plant equipment" to a customer engineer 20 using a transceiver. To coincidence, it points to the location of plant equipment on the monitor display 11.

[0061] A touch panel senses the location (x y) to which the monitor 19 pointed on the screen, and notifies it to a workstation 17.

[0062] A workstation 17 asks the current rate Z of a zoom of the surveillance camera 13 by which current selection is made through the network 15 for remote control. And the include angle to which the surveillance camera 13 by which current selection is made from the location on the screen to which the monitor 19 told from the touch panel pointed (x y) is moved is calculated. (Several 1) Based on this count of several one, the include angle of the surveillance camera 13 by which current selection is made by the include angle (Rx, Ry) is changed. A command is sent to the surveillance camera remote control 14 by which current selection is made through the network 15 for remote control so that only the degree of -Ry may be moved in the x directions in the degree of -Rx, and the direction of Y. The surveillance camera remote control 14 by which current selection is made moves the surveillance camera 13 by which current selection is made like this value, and the surveillance camera 13 by which current selection is made becomes the include angle for which the location which the monitor 19 pointed out comes to the middle of a screen.

[0063] Red pointing light equipment 22 is attached in the surveillance camera 15, and the sense is set up so that it matches in agreement with the optical axis of the lens of a surveillance camera 15 exactly. Therefore the light of red

pointing light equipment 22 comes to shine upon the plant equipment which is showing at the core on the monitor display 11.

[0064] for this reason, the surveillance camera 13 by which current selection is made so that the plant equipment to which the hitcher on pointed may take the lead in a monitor display — moving — in addition — and the light of red pointing light equipment 22 comes to shine upon that body. Therefore, even when there are two or more surveillance cameras, the customer engineer 20 which is present in a site can understand concretely that the hitcher on 19 is looking at plant equipment.

[0065] Thus, even when there are two or more surveillance cameras and red pointing light equipment, a hitcher on can point to a device to a customer engineer like one case.

[0066] Moreover, at this time, also when the number of a surveillance camera and red pointing light equipment is an inequality, it thinks.

[0067] In such a case, a surveillance camera and red pointing light equipment are controlled separately. And at least one red pointing light equipment corresponding to each surveillance camera is decided. If there is red pointing light equipment when a surveillance camera is chosen, it will suppose that a suitable thing is chosen, and if there is nothing, a hitcher on will be notified of pointing being impossible.

[0068] Moreover, such equipment can be used not only for the monitor of a plant but for a system which holds a conference by remoteness. Drawing 11 is the example which carried out this invention in teleconferencing. It is a meeting table having the workstation by which 1101 embedded the member of a meeting and 1102 embedded the display and the touch panel.

[0069] The meeting table 1102 with a built-in workstation which controls a partner's remote pointing equipment respectively is offered on both conference rooms. The display is embedded in the upper part of the meeting table 1102, and the touch panel is attached to the front face. By pointing out the image in the hall of the other party reflected on this meeting table 1102, the member 1101 who has participated in the meeting can point to a body, a person, etc. at the hall of the other party with red pointing light equipment 22.

[0070] By using such equipment, the pointing of the information on the environment around each other can be shared and carried out, and closer communication is attained.

[0071]

[Effect of the Invention] It comes to be able to perform the increase of the means of the communication in the distant location, and a better plant monitor by this invention. The time and effort of electronizing a document on the occasion of informational sharing until now stops moreover, taking by applying this invention to a remote conference system.

[Translation done.]

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3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the block diagram of the example which fixed red pointing light equipment to the surveillance camera.

[Drawing 2] Drawing 2 is the conceptual diagram having shown the frame of a surveillance camera.

[Drawing 3] Drawing 3 is the block diagram of the example which controls red pointing light equipment independently of a surveillance camera.

[Drawing 4] Drawing 4 is the explanatory view of the example which attached luminescence equipment to the candidate for a monitor.

[Drawing 5] Drawing 5 is the explanatory view of an example of the correspondence table of the relation between the field on a monitor display, and a device.

[Drawing 6] Drawing 6 is the explanatory view of an example of the tag attached in ** which uses an image processing for a monitor.

[Drawing 7] Drawing 7 is the explanatory view of an example of the correspondence table of the name of a device, and the include angle of red pointing light equipment.

[Drawing 8] Drawing 8 is the explanatory view of the example which chooses the device to which it points with a menu.

[Drawing 9] Drawing 9 is the explanatory view of an example of the correspondence table of a menu number and the include angle of red pointing light equipment.

[Drawing 10] Drawing 10 is the explanatory view of the example which used much surveillance cameras and red pointing light equipments.

[Drawing 11] Drawing 11 is the explanatory view of the example which applied this invention to the remote conference system.

[Description of Notations]

11 [— A surveillance camera remote control, 15 / — The network for remote control, 16 / — The network for image transmission, 17 / — A workstation, 18 / — Plant equipment, 19 / — A monitor, 20 / — A customer engineer, 21 / — A transceiver, 22 / — Red pointing light equipment.] — A monitor display, 12 — A touch panel, 13 — A surveillance camera, 14

[Translation done.]

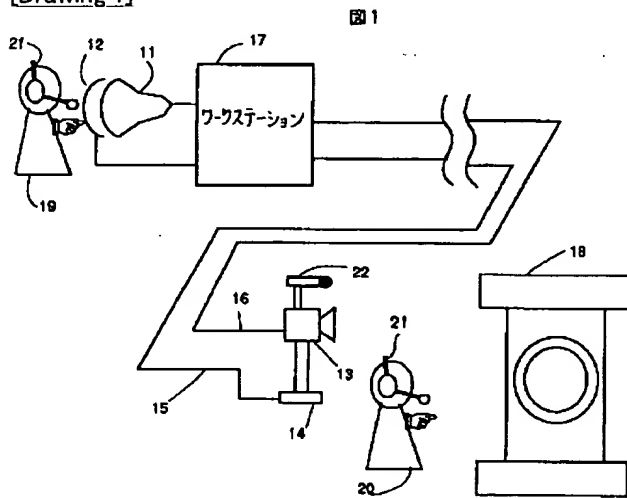
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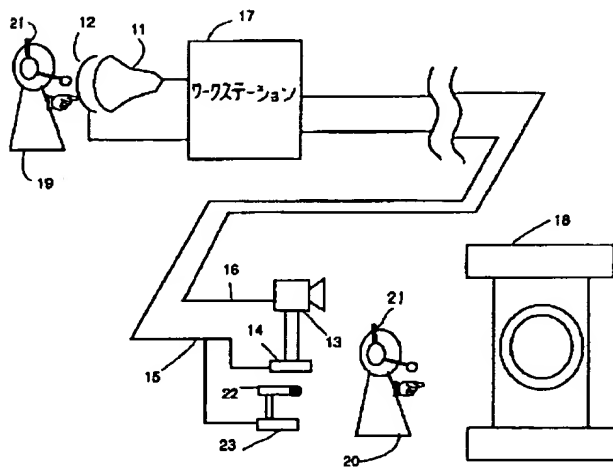
DRAWINGS

[Drawing 1]



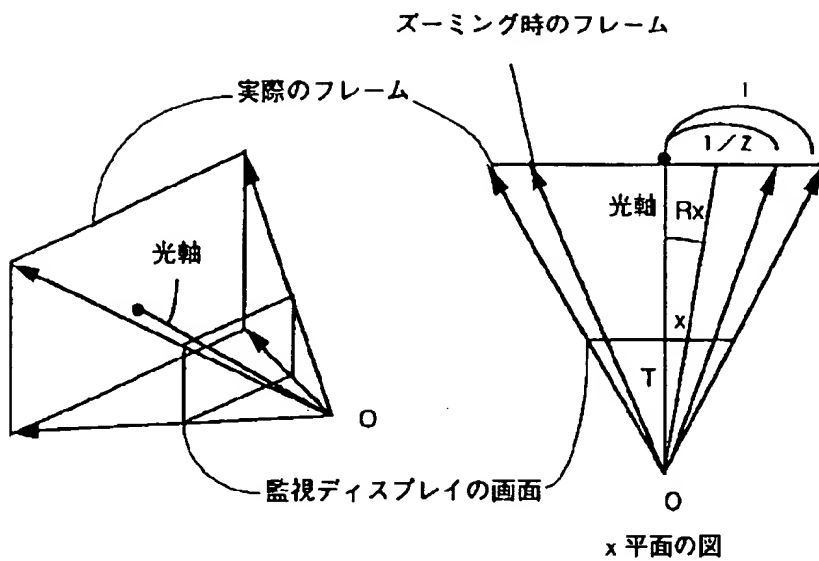
[Drawing 3]

図 3



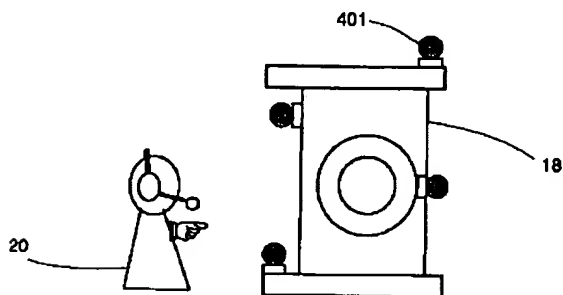
[Drawing 2]

図 2



[Drawing 4]

図 4



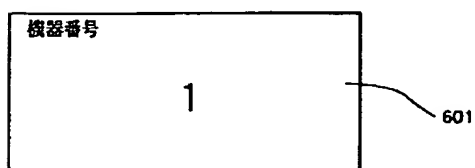
[Drawing 5]

図 5

項番	領域	機器名	機器番号
1	(10, 10)-(100, 100)	機器 1	1 2
2	(150, 100)-(400, 120)	バルブ 1	1 4
3	(-100, 100)-(-200, 200)	機器 2	3 7
4	(500, 300)-(550, 350)	バルブ 2	5 1
5	(-200, -120)-(-220, -170)	台座	1 7

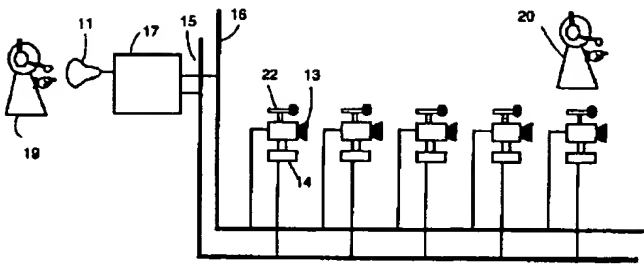
[Drawing 6]

図 6



[Drawing 10]

図 10



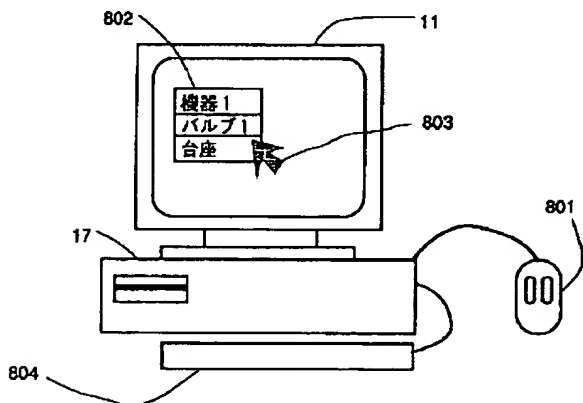
[Drawing 7]

図 7

機器番号	機器名	赤色ポインティングライト装置の角度	
		x 方向	y 方向
1 2	機器 1	3 0	- 1 0
1 4	バルブ 1	2 0	1 5
3 7	機器 2	4 5	- 3 0
5 1	バルブ 2	- 5	0
1 7	台座	7 0	- 7 0

[Drawing 8]

図 8

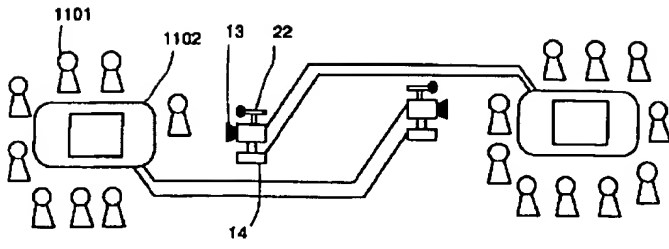


[Drawing 9]

図 9

メニュー項目番号	機器名	赤色ポインティングライト装置の角度	
		x 方向	y 方向
1	機器 1	3 0	- 1 0
2	バルブ 1	2 0	1 5
3	機器 2	4 5	- 3 0
4	バルブ 2	- 5	0
5	台座	7 0	- 7 0

[Drawing 11]



[Translation done.]

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CORRECTION OR AMENDMENT

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3/033 360
H04N 7/15

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[Procedure revision]

[Filing Date] October 6, Heisei 10

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[Proposed Amendment]

[Claim(s)]

[Claim 1] It is remote pointing equipment which directs the object which is in B point from A point.

An image pick-up means to picturize the image of B point,

An image transfer means to transmit the image information obtained by this image pick-up means to A point,

An image display means to display on a screen the image transmitted from B point at A point,

A directions means to direct the object of B point at A point based on the image displayed by this image display means,

A control information generation means to generate control information according to the output of this directions means,

A control information transfer means to transmit said control information to B point,

A change inducement means to make change which can be checked by looking to said some of directed objects [at least] cause at B point based on the transmitted this control information,

Remote pointing equipment characterized by preparation *****,

[Claim 2] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on the name of the object which it keyed.

[Claim 3] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on the list menu of an object on said screen.

[Claim 4] Said directions means is remote pointing equipment according to claim 1 characterized by specifying an object based on two or more icons showing an object.

[Claim 5] The process monitoring system characterized by having made said A point into the central operation room, and making said B point into the site of a plant using remote pointing equipment according to claim 1.

[Claim 6] The remote conference system characterized by making 2 sets of remote indication possible from the both sides of teleconferencing using remote pointing equipment according to claim 1.

[Translation done.]

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